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ABSTRACT

The process of adapting the Wechsler Intelligence Scale for Children-Revised (WISC-R) for Puerto Rico was begun with the following objectives: (1) to review the existing Spanish translation of the WISC-R; (2) to adapt the WISC-R to Puerto Rican culture and milieu; and (3) to standardize the scale with a representative sample of Puerto Rican children and adolescents. A revised version was prepared to improve the translation and eliminate cultural bias. An item bank was tested with 240 children and adolescents from public and private schools in Puerto Rico to select items for the final form. The final form was standardized with 2,200 subjects whose native language was Spanish. The test was administered by 16 testers trained in the examination process. Information about the background of subjects was completed for 81% of the sample. The examination process began in October 1988 and was completed in December 1989. Data input and analysis continue to enable the eventual measurement of the cognitive abilities of Puerto Rican children and adolescents using a valid, reliable, and locally standardized test. Ten tables present study information. A 33-item list of references is included. (SLD)

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Standardization of the WISC-R in Puerto Rico: The process and the preliminary findings.

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The assessment of Hispanics and other minority children and adults will remain an issue for the American psychologists to deal with until adequate solutions are provided by those who are most endangered by the discriminatory application of invalid and unreliable tests to these populations.

The question is not whether to assess or not to assess, but to develop valid and reliable instruments for the assessment of those who comprise the endangered species: Hispanics, Blacks, Asian and Native Americans.

The issues surrounding the use and application of cognitive tests to minority groups in the USA, are issues of tests' validity and reliability. Issues on validity are the most crucial of all (Anastasi, 1958, 1985; Clarizio, 1979; Clarizio,1982; Flaugher, 1978; Herrans & Canino, 1984; Herrans, 1985; Mercer, 1979; Munford & Muñoz, 1980; Oakland & Glutting, 1990; Oplesch & Genshaft, 1981 & Sattler, 1982).

In contrast to the position of some of our colleagues, we take the stand that psychology, if it is to maintain its position among scientific disciplines, must produce valid and reliable measuring instruments. For it is by objectively and scientifically measuring and observing our object of study that we have achieved the stature of a respectable science. Through valid and reliable instruments we will achieve the objectives of all sciences: control and prediction.

The ideology of psychological measurement is not that of power or political or economic dominance. The ideology of psychological measurement rests on the paradigm of Psychology as a science, which is the unavoidable recognition of individual differences (Herrans, 1988). Individual differences which are present in our object of study, individual differences sometimes easily recognizable, and other times hidden and obscure, but still individual differences.

These individual differences that haunt the psychologist are not created, nor produced by the scientist. They are there for the scientist to observe and study. In fact, measuring these differences may bring them to the forefront of sociopolitical issues and struggles, but does not create them. Measuring these differences only points clearly towards the need to take them into consideration in making decisions, but the measurement instrument does not create the differences and very often the scientist does not set the rules of how to deal with, nor how to react to them.

Psychological measurements in fact, may and do identify with precision where the differences are and may point towards the biosocioeconomic factors contributing to these differences. By doing so, it helps us all in eradicating social injustice.

Since validity of the measuring tools is the crux of the matter when issues are raised against testing, in Puerto Rico a

group of concerned psychologists decided to "take the bull by its horns" (Herrans, Canino & Rodríguez, 1985). Thus, the WISC-R, Puerto Rico project was born and developed. The WISC-R, P.R. research project, as it has been known since its conception, is the product of many who were concerned about the discriminatory application of USA norms to our children and adolescents.

Previous studies done in the USA and in Puerto Rico demonstrated that the content and the norms of the WISC and the WISC-R were not appropriate to measure the cognitive development and functioning of Hispanic, Black and other minority group in the USA (Clarizio, 1982; Herrans, 1985; Matías & Zaidspiner, 1986; Mercer, 1979; Munford & Muñoz, 1980; Reschly, 1981 and Rodríguez, 1987). The resulting mislabelling of our children was and is considered too high a price to be paid by us. Therefore, the Department of Health of the Government of Puerto Rico, the Department of Education, the University of Puerto Rico, the Council on Developmental Deficiencies, the Puerto Rico Community Foundation and the Psychological Corporation among others, paved the road for the development of the Puerto Rican WISC-R. The contribution of so many, is by itself an explicit recogniton of the urgent need of our proposed product.

The WISC-R, P.R. project was designed to accomplish the following main objectives:

1) to review the existing translation of the WISC-R done in Dade County, Florida, and distributed by the Psychological

Corporation as an experimental form; 2) to adapt the WISC-R to the Puerto Rican culture and milieu and; 3) to standardize the scale with a representative sample of Puerto Rican children and adolescents.

Revision of the translation into Spanish of the WISC-R done in Florida was part of the process of adaptation of the instrument to our local milieu. In this revision we excluded every phrase, every response sample, every single instruction which we deemed foreign to our ways of communicating with others. We then tried to use phrases, instructions and response samples consonant with our ways, in the most simple Spanish but with high regard for grammatical correction and cultural appropriateness. We believe we achieved our goal. The Adaptation of the WISC-R, P.R. project included different phases: eliminating items which the staff considered culturally unsuitable, creating new items culturally suitable, doubling the numbers of items of the scale, estimating the level of comprehension of instructions and the testing of the Experimental Form which was constructed through this process.

Let us synthetize the adaptation process, for it is the crucial aspect of our project and with it we are dealing with the validity issue.

Adaptation of instruments to the culture of the populations to which they are going to be applied is one way to deal with the issue of whether or not the test is tapping experiences common to

the children or adults being assessed. The mere standardization of a literally translated tool does not solve the issue of validity. As illustrated by Padilla, Roll and Gómez-Palacios (1982) in Mexico, translation and standardization without adaptation tend to produce depressed IQ's when compared to the USA norms. This tends to reinforce prejudiced attitudes in the perception of inferiority by ethnicity.

In this process, as stated above, all items considered culturally biased were deleted and substituted by new items which, at face value, the staff considered more culturally appropriate. In this way, for example, item number 18 of the Information subtest of the original WISC-R, "From what country did America become independent in 1776?", was eliminated and substituted by an item of new creation; so was item number 19, "Name two countries that border the United States?"

The above process continued until every single item in the Verbal Scale considered culturally biased was substituted. The Performance substests underwent less changes in this process of adaptation. Some items were substituted in Picture Arrangement and the Picture Completion subtests, four items were added to Block Design, not for cultural reasons but to improve its ceiling.

In this phase of the project, we created new items or added old ones (from the WISC) for eight out of the twelve subtests of the scale.

The Adaptation process also required the creation of an item bank to be tested with a small representative sample (N=240) in order to select the best items for inclusion in the final form, that would be later standardized in a larger representative sample of Puerto Rican children and adolescents (N=2,200).

Table 1 illustrates the WISC-R subtests whose item content was changed through the process of adaptation.

Insert Table 1 about here

In synthesis, the number of items in the original form of the scale was raised by fifty percent (50 %) for Information, Similarities and Vocabulary subtests; thirty-three percent (33 %) to thirty-eight percent (38%) for the Block Design, Arithmetic and Comprehension substests; and a twenty-three percent (23%) to twenty-five percent (25%) for Picture Completion and Picture Arrangement.

The process of reviewing and adapting instructions was done simultaneously with the adaptation of the item content. This process is treated in more detail by Rodríguez et al., in a separate paper.

Once both processes were completed,we assembled the Experimental Form of the Puerto Rican WISC-R to ascertain its

psychometric properties in a sample of N=240 subjects in three different age levels; (6-0/6-11; 10-0/10-11 and 16-0/16-11).

Testing the Experimental Form of the Puerto Rican WISC-R (or EIWN-R de Puerto Rico)

A randomly selected sample of N=240 children and adolescents from the public and private shools of Puerto Rico, equally divided by sex, from both the urban and rural zones of Puerto Rico and from three different age strata (6-0/6-11; 10-0/10-11 and 16-0/16-11) was used to evaluate the psychometric properties of the items of the Experimental Form of the Puerto Rican WISC-R. Validity, reliabilty and difficulty indexes were computed for the Scale from the data derived from this sample.

Table 2 illustrates the distribution of the sample by the variables of sex and age (N=240).

Insert Table 2 about here

In the sample selection process, the children's socioeconomic level was controlled. Only Puerto Rican children whose dominant language was Spanish were included. Children with physical or mental handicaps, as well as children diagnosed as mentally retarded were excluded from the sample.

Dr. Miguel Valencia, our sample statistician, was in charge of the sample selection process. He developed a probabilistic multiphasic selection process with the probability of selection being equal to the school's total registration.

The testing of the whole sample (N=240) was done by four M.A. level psychologists, well trained in the administration and scoring procedures of the Experimental Form of the WISC-R of Puerto Rico.

Once the sample was tested, a double check of the scoring was done by the principal investigators and the research associates of the project.

Statistical Analyses

The data from the N=240 subjects were submitted to statistical analyses using the SPSSX-PC and ITEMAN programs.

The following psychometric properties of the scale were obtained:

1. Difficulty indexes for each item for all the subtests.
2. Temporal reliability indexes for the coding, mazes and digit-span subtests.
3. Internal consistency reliability indexes (Alpha) for each subtest.
4. Point biserial coefficients (items-test reliability) for an estimate of the items validity.

A comparative study by variables of sex, zone of residence and socioeconomic levels was done using Fishers "t" test and Z for testing the significance of the differences. The .05 level of significance was used to evaluate results.

The assembling of the final form of the Puerto Rican WISC-R took into consideration the difficulty indexes for each item and only included those items whose validity index was .20 or more.

Results

Table 3 shows the percentage of items, by subtests, which were eliminated from the 1974 WISC-R based on the N=240 substudy results, which rendered psychometric properties of the items.

Insert Table 3 about here

As Table 3 illustrates, substantial changes were produced in the 1974 WISC-R by means of our adaptation process.

Eight of the twelve subtests of the scale were subjected to some kind of change, this accounts for 66% of the total.

As may be seen in this table, the Similarities subtest (47%) followed by the Information subtest (43%) underwent the most substantial changes.

The importance of highlighting these results cannot and should not be underestimated. Information and Similarities are two of the Verbal Scale subtests which are highly correlated with Spearmans' G factor (Kauffman, 1979; Sattler, 1982). The third Verbal subtest highly correlated with G is Vocabulary, which according to our results, had changes estimated in 28%. Another subtest of the Verbal Scale which suffered a relatively large change was Comprehension (31%).

After a selection of items by subtest based on their psychometric properties, internal consistency and temporal reliability estimates were computed for each subtest of the new assembled scale. Table 4 illustrates the internal consistency reliability coefficients for the 12 subtests of the Puerto Rican WISC-R by age group. Table 5 illustrates the temporal reliability coefficients for the Digit-Span, Coding and Mazes.

Insert Table 4 about here

Insert Table 5 about here

Finally, discontinuation criteria for each subtest were established by computing the effect on total score of discontinuing the subtest after various numbers of consecutive

failures. Our discontinuation criteria came out exactly as those of the 1974 WISC-R.

Differences on the Puerto Rican WISC-R by Sex, Zone of residence and Socioeconomic level.

Once the Puerto Rican WISC-R (final form to be standardized) was assembled, the records of the n=240 subjects were rescored and data rearranged for statistical analyses to explore the impact, if any, of the variables sex, zone of residency and socioeconomic level on the subjects' raw scores on each subtest of the scale (Herrans & Rodriguez, 1988).

A review of the literature showed that in the continental USA, most of the studies examined revealed sex differences on measures of cognitive abilities as follows: females do better than males in the verbal areas measured; males do better than females in the numerical reasoning and spatial relations (Maccoby & Jacklin, 1974; Hoyaguen & Hoyaguen, 1979 and Halpern, 1986).

The magnitude of these sex differences is highly significant in the numerical reasoning ability; moderately significant when spatial-visual relations are concerned, and slightly significant when verbal abilities are involved (Halpern, 1986). Interestingly the magnitude of the sex differences with respect to the numerical reasoning ability tends to increase as the level of cognitive functioning increases (Jones, 1984).

The literature offers different explanations for these differences: genetic, brain dominance, biological

predispositions, factorial loading of abilities and socio-cultural factors such as: differential rearing practices and training in sexual roles among others (Maccobby & Jacklin, 1974; Jacklin, 1989).

The socio-political implications of these differences should not be underestimated. These differences may be partial explanation or used to justify male dominance in world affairs. Most of the articles reviewed attribute the sex differences to the influence of our rearing practices and the way in which we deal with our children.

In the continental USA the sex differences are cancelled when the Full Scale IQs are computed, and therefore, no sex differences are observed. Moreover, the sex differences tend to appear only after puberty and remain so until old age (Halpern, 1986; Hoyaguen & Hoyaguen, 1979). What happens in Puerto Rico? The only known study on sex differences in cognitive measures was done by Herrans (1969). In this study males scored higher than females in one third of the comparisons observed, regardless of their education or zone of residency.

On the data of the N=240 Puerto Rican children of the WISC-R, P. R. project, sex differences were produced at all age levels and increased directly with age. Table 6 illustrates these differences.

Insert Table 6 about here

At all age levels the sex differences favored the male subjects except in the comparisons of Digits Backward (16-8/16-11) and Coding (10-8/10-11). Both subtests' factor loading in G is negligible (r=.47 and r=.42) (Kauffman, 1979).

While the literature claims that in the USA sex differences do not appear until puberty, in Puerto Rico we are observing sex differences by age 6 with a tendency to increase as children grow older.

If these results are repeated in the standardization sample we will have to consider the need for establishing norms by sex.

Differences by Zone of Residence

A comparison of the Puerto Rican WISC-R raw scores was also done by zone of residence, since previous research in Puerto Rico informed differences in cognitive abilities by zone of residence (Herrans, 1969).

Table 7 shows the obtained differences in the subjects' raw scores by the variable of zone of residence by age group. All comparisons favored the urban residents except in the age bracket of 16-8 to 16-11.

Insert Table 7 about here

Differences by the socioeconomic level variable in the raw scores of the N=240 subjects of the WISC-R, P.R. project

The literature abounds on the issue of the influence of socioeconomic factors on cognitive functioning and its measurement. From the arrogant stand of Cyril Burt to the unsubstantiated position of Arthur Jensen, studies proliferate illustrating the negative influence of poverty and deprivation on cognitive development (Mercer, 1979; Sewell, Tillery & Price, 1983; Manni, Winiker & Keller, 1984; Jensen, 1980; Burt, 1972). In Puerto Rico, Guevara and Sesman (1978) showed how differential treatment interactions with their children by mothers from two different socioeconomic levels is related to differential scoring on several subtest of the WISC. Mothers from high middle class sectors tended to interact more verbally with their children than mothers from the low socioeconomic sector. Marked differences in verbal performance were observed in their children.

Tables 8, 9 and 10 show our comparisons by socioeconomic sector on the data of the N=240 subjects of the WISC-R, P.R. project.

Insert Table 8 about here

Insert Table 9 about here

Insert Table 10 about here

In synthesis, what is observed so far is devastating. The high socioeconomic sector children did significantly better in all comparisons by age than the middle socioeconomic sector children, and these did significantly better throughout the whole age range than lower socioeconomic sector children.

It is also observed that in the adolescent group the gap by socioeconomic sector becomes wider and the middle and low groups are set further apart. It seems that the initial early differences in the age group become cumulative and the social abyss become deeper.

The psychologists of the WISC-R, P.R. project are keenly aware of these results and are planning to replicate those analyses on the standardization data.

In the construction of the WISC-R of Puerto Rico these observed differences by sex, socioeconomic sector and zone of residence were not inherent to test's format. The differences exist out there in our society and it will take our concerted effort to minimize, and if possible eradicate them in order to produce a better society. By accusing the measurement process of creating these differences we will never reach our goal of eradicating discrimination by sex, ethnicity or sociocultural factors. Or worse, by being blind to the social factors that are related to the generation and expansion of these differences, we will be contributing to the deprivation of our children's rights by the dominant sectors in our society.

The standardization of the Puerto Rican WISC-R in a representative sample of N=2,200 subjects

Once the final form of the Puerto Rican WISC-R was assembled, the preparation for the standardization process began. Sample selection was done by our sampling expert, Dr. M. Valencia, from the school population, between the ages of 6-0 to 16-11 years of age. Only those subjects whose native language was Spanish and who had not been diagnosed as suffering from debilitating physical or mental conditions were to be selected. A sample of 2,200 subjects was obtained.

The sampling frame used were the lists of the enrollment in public and private schools in Puerto Rico prepared by the Department of Education.

The sample allocation was as follows: equal numbers of boys and girls in each of the 33 age groups. Each age group had either 66 or 68 subjects. Total sample size was allocated in proportion to the school population in the 21 strata obtained by classifying the schools in each of the seven geographic regions defined by the Department of Education into three classes, namely: urban public, rural public and private.

Sample selection

A multistage probability selection procedure was used to select the sample of subjects. In the first stage, school districts were selected within each stratum with probability proportional to the school population. Three substrata were used: elementary (grades 1 to 6), intermediate (7 to 9) and high school (10 to 12). Selection between substrata was independent. Thus, the same school could be selected to represent more than one substratum.

In the second stage, schools were selected from school districts in the sample. A school was selected from the district for each time the district was selected. The probability of selection of school was proportional to the school population in the corresponding classification. That is, if a school district was selected to represent intermediate school grades (7 to 9) in a given stratum, an intermediate school was selected in that district. If the same district was also selected to represent the high school grades (10 to 12) in that stratum, a high school was selected. If the same school offered both intermediate and high school grades, it had probability to represent the district in both classes. The probability of selection of a school to represent a district in a given class was proportional to the school enrollment in the grades corresponding to that class.

In the third stage, grades were selected from the schools in the sample. Total sample size in the stratum was allocated in

clusters of 4 children as evenly as possible among selected schools. Some schools were paired to complete the clusters of 4 children. Then, grades were systematically selected from the schools representing the stratum.

In the final stage, children were selected from the grades in the sample. Lists of children who qualified for the test were prepared. A separate list was prepared for each of the two parts: children with academic index above average, and those under the average. Then one child was selected at random from each part of the list. Otherwise, two children were selected at random from each age-sex list. The composition of each cluster of 4 children from the same school grade for a given age group was: one boy above average in academic index, and one below average, one girl above average and another below.

The training of testers on the examination process using the Puerto Rican WISC-R.

Twelve bachelor's degree level testers and four M.A. level psychologists were submitted to a two months intensive training in the process of administering the Puerto Rican WISC-R.

The training process included lectures on measurement's basic concepts prepared and given by the Principal Investigators and the Research Associates (Ph.D. level) from the two major contributing higher educational institutions: the University of Puerto Rico and the Caribbean Center of Postgraduate Studies.

Practical experience with children within the age brackets included in the scale was provided and the M.A. level psychologists supervised the testers performance on these selected experiences.

The examination process of the standardization sample (N=2,00) began in October 1988 and was completed in December 1989. Additional samples for the validity and reliability substudies were also examined by this date.

By January 1990, the project staff was involved in the double check process of re-scoring all records of the sample. The re-scoring process was completed and the codification of the data for entry into computer was initiated. We are still in this process of data input and analysis.

Secondary gains of the WISC-R, P.R. Project

A General Information Form was prepared and distributed among the children and adolescents of the standardization sample. The form was given to the specific subjects examined, to be filled by their parents, and to be returned to either the testers or the school authorities. Eighty one percent (81%) of these forms were returned to the project's staff. A remarkable return rate!

The General Information Form included variables such as:

demographic data on the sample's subject; parents' occupation, education and civil status; developmental data on the sample's subjects and data on their medical and school history.

For the first time in Puerto Rico, this important information has been gathered in a representative sample of Puerto Rican children (6-0 to 16-11) and adolescents. Several studies describing this population and correlating IQs with these variables and among themselves will follow.

A glimpse of the future

Once the Puerto Rican WISC-R is published and its use prevails, the purpose of the WISC-R, P.R. project will be completely achieved. For the first time in our history, the measurement of the cognitive abilities of our children and adolescents will be accomplished using a valid, reliable and locally standardized test. The current discriminatory practice of comparing the performance of Puerto Rican children with USA norms will be completely eradicated. Re-examination of the mis-diagnosed children within the population may be done. The problem of children misplaced as a result of of incorrect diagnosis and classification will have to be addressed.

Replication of our project will probably follow in other Latinamerican countries. Argentina is already working towards this end.

Replication of our project with representative samples of the so called minority groups in the continental United States of America conveys what we call our hopeful thinking. Separate norms by ethnic groups with an anchor national normed test should follow (Loiselle, 1964).

Multicultural United States of America cannot and should not avoid its responsability towards those who are perceived as DIFFERENT.

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Table 1

Altered WISC-R subtests and number of new items per subtest.

Subtests	Numbers of new items per subtest
Information	15
Picture Completion	6
Picture Arrangement	3
Arithmetic	6
Block Design	4
Vocabulary	15
Comprehension	6

Table 2

Sample distribution by the variables of sex and age (N=240)

Age group	Males	Females	Total
6-0 a 6-3	20	20	40
6-8 a 6-11	20	20	40
10-0 a 10-3	20	20	40
10-8 a 10-11	20	20	40
16-0 a 16-3	20	20	40
16-8 a 16-11	20	20	40
Total	120	120	240

Table 3

Percent of items deleted from the original WISC-R, by subtest[1]

Subtests	Original number of items by subtest	Number of items deleted by subtest	
		Number	Percent
Information	30	13	43
Comprehension	16	5	31
Arithmetic	18	3	17
Similarities	17	8	47
Vocabulary	32	9	28
Picture Completion	26	4	15
Picture Arrangement	12	2	17
Block Design	11	3	27

1 Changes and deletions were done on eight (8) out of the twelve WISC-R susbtests.

Table 4

Alpha coefficients of correlation for the Puerto Rican WISC-R by age group (N=240).

Subtests	AGE GROUPS					
	6-0 to 6-3	6-8 to 6-11	10-0 to 10-3	10-8 to 10-11	16-0 to 16-3	16-8 to 16-11
Information	.62	.58	.81	.79	.89	.83
Picture Completion	.73	.76	.67	.68	.70	.74
Similarities	.86	.84	.83	.69	.79	.81
Picture Arrangement	.68	.77	.65	.57	.34	.50
Arithmetic	.70	.47	.73	.39	.75	.70
Block Design	.73	.63	.77	.76	.81	.73
Vocabulary	.64	.79	.81	.80	.86	.82
Object Assembly	.38	.66	.71	.62	.50	.38
Comprehension	.70	.74	.69	.62	.75	.71
Digits Forward	.51	.54	.50	.60	.70	.68
Digits Backward	.45	.35	.46	.25	.67	.54
Mazes	.76	.67	.57	.46	.48	.31

Table 5

Temporal Reliability Coefficients for the Puerto Rican WISC-R Digit Span, Coding and Mazes Subtests (Pilot Study II Data)

Subtests	Temporal Reliabilty Coefficients*
Digits Forward	.7356
Digits Backward	.8083
Coding	.9115
Mazes	.8987

* $p = .050$
N = 28

Table 6

Subtests showing significant sex differences on the Puerto Rican WISC-R raw score data (N=240) by age group.

	Fishers' "t" by age groups**					
Subtests	6-0 to 6-3 N=40	6-8 to 6-11 N=40	10-0 to 10-3 N=40	10-8 to 10-11 N=40	16-0 to 16-3 N=40	16-8 to 16-11 N=40
Information	2.32*	___	2.07*	___	4.48**	2.20*
Picture Completion	___	___	___	___	2.88**	___
Similarities	___	___	___	___	___	___
Picture Arrangement	___	___	___	___	___	2.04
Arithmetic	2.05*	___	___	___	___	___
Block Design	___	___	3.50**	___	2.78**	___
Vocabulary	___	___	___	___	2.22*	___
Object Assembly	___	___	___	___	___	___
Comprehension	___	___	___	___	___	___
Digits Forward	___	___	___	___	___	___
Digits Backward	___	___	___	___	___	-2.15**
Coding	___	___	___	-2.80**	___	___
Mazes	2.24*	2.50*	3.86**	2.30*	___	___

* t significant at p=.05
** t significant at p=.01
*** All comparisons tend to favor the males, except Digits Backward which favors females at the age group 16-8 to 16-11 and Coding which favors females at the age group 10-8 to 10-11.

Table 7

Significant differences by zone of residence (Urban-Rural) in the raw scores of the Puerto Rican WISC-R (Experimental Form N=165).

Subtests	"t" test by age groups***					
	6-0 to 6-3 N=35	6-8 to 6-11 N=35	10-0 to 10-3 N=29	10-8 to 10-11 N=28	16-0 to 16-3 N=19	16-8 to 16-1 N=19
Information	___	___	___	___	___	___
Picture Completion	___	___	___	___	___	___
Similarities	___	___	___	___	2.18*	___
Picture Arrangement	2.24*	___	___	___	___	___
Arithmetic	___	___	___	___	___	___
Block Design	___	___	2.18*	___	___	___
Vocabulary	___	___	___	___	___	___
Object Assembly	2.52*	___	___	___	___	___
Comprehension	___	___	2.17*	___	___	___
Digits Forward	___	___	___	___	2.13*	___
Digits Backward	___	___	___	___	___	___
Coding	___	2.76**	___	___	___	-3.12**
Mazes	___	___	___	2.49*	___	___

* t significant at p=.05
** t significant at p=.01
*** All comparisons tend to favor the urban residents, except in Coding at the age level of 16-8 to 16-11.

Table 8

Significant differences by the socioeconomic sector variable (High vs. Middle) in the raw scores of the Puerto Rican WISC-R (Experimental Form, N=130).

	"t" test by age groups***					
Subtests	6-0 to 6-3 N=20	6-8 to 6-11 N=20	10-0 to 10-3 N=20	10-8 to 10-11 N=21	16-0 to 16-3 N=25	16-8 to 16-1 N=24
Information	___	___	___	___	___	___
Picture Completion	2.96**	___	___	___	___	___
Similarities	___	___	___	3.94**	___	___
Picture Arrangement	5.58**	___	___	___	___	___
Arithmetic	___	___	___	___	___	2.19*
Block Design	3.03**	2.89**	___	___	___	___
Vocabulary	2.38*	___	___	___	___	___
Object Assembly	___	___	___	___	___	___
Comprehension	___	___	___	___	___	___
Digits Forward	2.22*	3.23**	2.53*	___	___	___
Digits Backward	2.35*	___	___	___	___	___
Coding	___	___	3.20*	___	___	___
Mazes	___	___	___	___	___	2.57*

* t significant at p=.05
** t significant at p=.01
*** All comparisons favored the high economic sector.

Table 9

Significant differences by the socioeconomic sector variable (High vs. Low) in the raw scores of the Puerto Rican WISC-R (Experimental Form, N=145).

Subtests	"t" test by age groups***					
	6-0 to 6-3 N=26	6-8 to 6-11 N=26	10-0 to 10-3 N=24	10-8 to 10-11 N=26	16-0 to 16-3 N=21	16-8 to 16-1 N=22
Information	___	2.37*	2.51*	___	3.04**	___
Picture Completion	___	___	___	___	___	3.82**
Similarities	___	3.64**	2.63*	3.23**	3.72**	2.59*
Picture Arrangement	2.17*	4.20**	___	___	2.89**	___
Arithmetic	___	___	3.63**	___	___	4.27**
Block Design	2.47*	3.28**	___	___	___	2.53**
Vocabulary	2.12*	___	___	___	2.70*	___
Object Assembly	2.56*	2.86**	___	___	___	___
Comprehension	___	___	2.28*	___	___	4.26**
Digits Forward	2.11*	4.21**	2.41*	___	___	___
Digits Backward	2.89**	___	2.46*	___	___	2.26*
Coding	___	___	2.54*	___	___	___
Mazes	___	___	___	___	___	2.24*

* t significant at p=.05
** t significant at p=.01
*** All comparisons favored the high economic sector.

Table 10

Significant differences by the socioeconomic sector variable (Middle vs. Low) in the raw scores of the Puerto Rican WISC-R (Experimental Form, N=205).

	"t" test by age groups***					
Subtests	6-0 to 6-3 N=34	6-8 to 6-11 N=34	10-0 to 10-3 N=34	10-8 to 10-11 N=35	16-0 to 16-3 N=34	16-8 to 16-1 N=34
Information	___	2.44	2.36	2.85**	3.23**	2.78**
Picture Completion	___	___	___	2.26	3.07**	3.99**
Similarities	___	3.60**	___	___	3.04**	2.91**
Picture Arrangement	___	2.87**	___	___	___	___
Arithmetic	___	___	2.23	___	___	2.30
Block Design	___	___	___	___	___	___
Vocabulary	___	___	___	___	2.58	3.47**
Object Assembly	___	2.14	___	___	___	2.93**
Comprehension	___	___	___	___	2.79**	4.20**
Digits Forward	___	___	___	___	___	___
Digits Backward	___	___	___	___	___	___
Coding	___	___	___	___	2.88**	___
Mazes	___	___	___	___	___	___

* t significant at p=.05
** t significant at p=.01
*** All comparisons favored the high economic sector.